belief that my work does not throw any light upon the causes of variation. There are however many zoologists who believe that it has such a bearing, and indeed it seems only natural that writers (such as Dr. Romanes himself) who retain the Lamarckian conception of the direct influence of surroundings in causing the variations of the higher animals, should believe (as I think wrongly) that they see evidence for the soundness of their views in the results of experiments in which the colours of insects have been completely modified in a single generation by the action of environment. EDWARD B. POULTON

Oxford, July 15.

The Thunder-Axe.

THOSE who are interested in the study of anthropology need no reminder as to the European belief in a connection between ancient stone weapons and thunder. It would be mere waste of time if I quoted instances of this connection; but it may not be devoid of interest to some of your readers if I bring to their notice a modern account of the thunder-weapon, as described to-day by a New Zealander. The account may also be of service to those studying another branch of anthropology—that concerning the influence and value of ancient and modern creeds warring in the minds of semi-civilized peoples. I shall make no comment of my own, but proceed to give a translation of a tale printed (in Maori only) in the pages of the native newspaper, the *Korimako*. The few words in it which were not understood by those acquainted with the ordinary Maori speech, I referred to old men well versed in the dialect of that part of New Zealand.

"*The finding of Te Awhiorangi.*

"The tribes of this island have hitherto only heard of Te Awhiorangi, but have not seen it. We, Ngarauru—that is, the people descended from Rangitaupea, our ancestor who hid the axe—have never seen it until now . . . One of our settlements, called Okutuku, is near Waitotara. Twenty natives from this settlement proceeded in a party for the purpose of gathering the edible fungus (Hākekākeka) for the purpose of sale. With the party went a young woman whose name was Tomairangi (Dew of Heaven), the wife of Te Potonga Kaiawha. This girl was a perfect stranger in the district: she did not know where the sacred (tapu) places were; she belonging to the Ngaitahu (a South Island tribe), but her father was of us, the Ngarauru. The girl wandered away by herself, looking here and there, searching for trees on which the fungus grew. She saw a tree on which there was fungus, and laid her hand on it, but suddenly there came the flash of the Axe. Following with her eyes the direction of the flash, she saw the Axe close against the foot of a Pukatea tree; a cry of terror broke from her, and she fled screaming. At the same time the thunder roared, the lightning flashed, and blinding hail burst forth in sudden storm, increasing her terror almost to madness. Her husband heard her cries as she flew along: but an old man, called Te Rangi Whakairione, directly he heard her shrieks, understood the reason of the outcry, so he began to chant an incantation, and the fury of the storm abated. When the party had assembled together in the open land, the old priest asked which of them had been to Tieke; whereupon the girl asked 'Where is Tieke?' The old man answered that it was beyond the turn at Waione. Tomairangi replied, 'I have been there, but I did not know it was a sacred place: I saw something that looked like a spirit, and I am full of great fear.' Then all the party went to ascertain what it was, and then they found that it was indeed the lost sacred Axe, Te Awhiorangi. After Te Rangi Whakairione had chanted another incantation over it, they all took hold of the Axe, and wailed over it. When the crying had ceased, they brought the Axe back to the settlement. All the tribe knew that the Axe was somewhere in that vicinity, for our ancestor Rangitaupea had passed the secret on to his children in the words, 'Te Awhiorangi is at Tieke on the plain close above the Cave of the Dead.' Until now that place has been unvisited, being entirely sacred till this day, the 10th of December, 1887. Then gathered all Ngarauru and some of the Whanganui and Ngatiapa tribes, in number 300 persons, and at dawn the next day the sacred thing was hung up on a tree that all might see it. The priests, Kapua Tautahi and Werahiko Taipuhi were at the head of the procession as they approached the place: they reciting charms and incantations as they moved along with the people following. All the people carried green branches in their hands as an offering to Te Awhiorangi. When the concourse drew near the place, *successive peals of thunder and flashes of lightning rent the air;* then came down a dense fog, making it dark as night. The Tohunga (priests) stopped the thunder and dispersed the darkness by their incantations. When the light again appeared, the people offered the green branches, together with a number of Maori mats, &c.; then they made lamentations, and sang the old songs in which the ancient Axe was spoken of by their forefathers."

Thus far the native account. Then follows an enumeration of the articles offered up as propitiation; then a description of the axe, which appears to be a huge and beautiful specimen of the stone weapon, so highly polished that the face of the beholder may be seen reflected in it. Afterwards, the pedigree, or rather the mythological history, of the axe, showing how (name by name) it had been handed down from the first Maori chief who came to New Zealand (Turi), and that it had descended to him, through the great god Tane, from the primæval pair, Heaven and Earth (Rangi and Papa). But our chief interest in it is the thunder heralding its finding.

EDWARD TREGEAR.

Wellington, N.Z., June 11.

The Dispersion of Seeds and Plants.

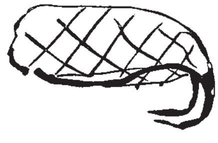
I HAVE read with much interest Mr. Morris's communication on the above subject (NATURE, vol. xxxvii. p. 466), and can corroborate most of what he states from personal observation. I can also remove his doubt respecting the germination of the seeds of the *Guava* and *Passiflora*, to which may also be added the *Tomato*.

I have adopted the "earth system" in my w.c., and from the place where the earth is deposited may always be gathered fine young plants of the three genera named above.

Thousands of acres of pasturage have been destroyed in this island by the distribution by birds of the *Lantana*, which was unfortunately introduced here by the first Roman Catholic missionaries, to form a hedge for their property at St. Louis or Conception. The "*Gendarme* plant" (an *Asclepiad*) was brought here in a pillow by a *gendarme* from Tahiti. It was a seed attached to a wing of silk cotton. The *gendarme* shook out his pillow; the wind carried the seed to a suitable spot, and now it vies with the *Lantana* in destroying our pastures.

I have shot the Great Fruit Pigeons of Fiji and this island with several seeds of the *Canarium* (?) in their crops, as Mr. Morris says, as big as hen's eggs. The seeds of water-plants are conveyed, with the eggs of fresh-water Mollusca, to vast distances, adhering to the hairs and feathers of the legs of water birds—ducks, herons, and waders of all sorts. In London the basins of the fountains in Trafalgar Square were peopled by *Lymnea* brought thither from the Serpentine, attached to the feathers of the sparrows who bathed, first in one, and then in the other.

Another plant which occurs to me as being largely indebted to man for its distribution, is that known as the "Cape Gooseberry," which is a native of South America (I forget its botanical name). The Kaffirs call it the "White man's plant," and say it follows the white man everywhere. I know it is found in India, Ceylon, Africa, Fiji, New Caledonia, New Hebrides. I really believe boiling it into jam does not destroy the vitality of the seeds. We have just got a plant here, bearing a lovely flower, but whence it comes no one knows. It has hard wooden seed capsules, each furnished with two hooks as hard as steel and as sharp as needles, this size and shape. These, hooking into the hide of any animal, would be carried for days until forcibly dislodged.



The "Bathurst burr" (*Xanthium spinosum*) was introduced into the Cape in a cargo of wool wrecked at Cape Lagulhas, and spread out to dry, first there, and then at Simon's Town, at both of which places the "burr" sprang up. I believe and hope I destroyed the first and last plant of it that sprang up in New Zealand some twenty-five years ago. The seed had been

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brought in the living fleece of a fine merino ram. The owner of the pasture was cherishing the "wonderful new plant," and was not a little horrified when I took out my knife and carefully cut it down. He was more horrified when I told him what it was.

The seeds of some of the Indian banians, I believe, require to pass through the bodies of birds to enable them to germinate. A minute bird (*Diceum*) feeds on them, and is so small that its dropping cannot fall clear of the branch on which it sits, consequently it is glued to the bark and takes root. Sometimes this takes place on a palm tree; the roots then run down the trunk, and finally smother their host.

British Consulate, Noumea, May 15. E. L. LAYARD.

Indian Life Statistics.

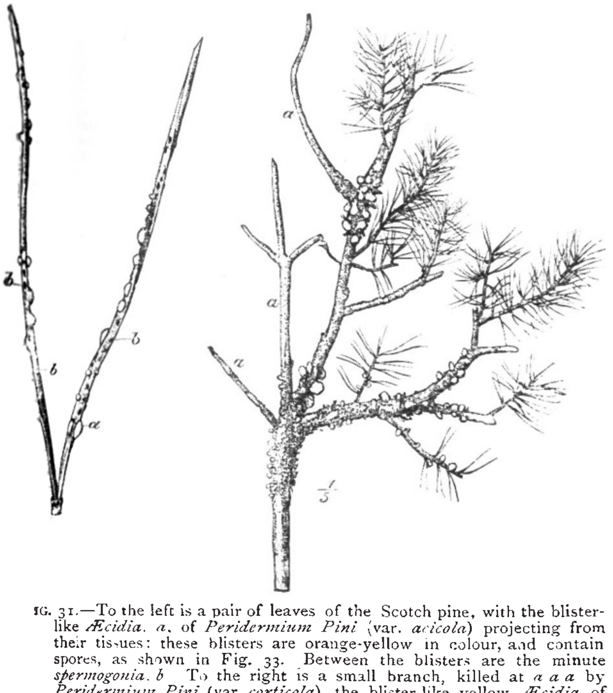
ALTHOUGH Mr. Hill (in NATURE of July 12, p. 250) refers to the *Holi* festival as among possible influences in causing variations of births, he does not say whether he considers lucky and unlucky months and years, which so largely affect marriages in India, as incidents which may have an effect.

HYDE CLARKE.

TIMBER, AND SOME OF ITS DISEASES.[1]

X.

IN the months of April and May, the younger needle-like leaves of the Scotch pine are occasionally seen to have assumed a yellow tinge, and on closer examination this change in colour, from green to yellow, is seen to be due to the development of what look like small orange-coloured vesicles standing off from the surface of the epidermis, and which have in fact burst through from the interior of the leaf (Fig 31). Between these larger orange-yellow vesicles the lens shows certain smaller brownish or almost black specks. Each of the vesicular swellings is a form of fungus-fructification known as an *Æcidium*, and each of the smaller specks is a fungus-structure called a *Spermogonium*, and both of these bodies are developed from a mycelium in the tissues of the leaf. I must employ these technical terms, but will explain them more in detail shortly: the point to be attended to for the moment is that this fungus in the leaf has long been known under the name of *Peridermium Pini* (var. *acicola*, *i.e.* the variety which lives upon the needle-like leaves).



IG. 31.—To the left is a pair of leaves of the Scotch pine, with the blister-like *Æcidia*. *a*, of *Peridermium Pini* (var. *acicola*) projecting from their tissues: these blisters are orange-yellow in colour, and contain spores, as shown in Fig. 33. Between the blisters are the minute *spermogonia*. *b* To the right is a small branch, killed at *a a a* by *Peridermium Pini* (var. *corticola*), the blister-like yellow *Æcidia* of the fungus being very conspicuous. (Reduced, after Hartig.)

On the younger branches of the Scotch pine, the Weymouth pine, the Austrian pine, and some others, there may also be seen in May and June similar but larger bladder-like orange vesicles (*Æcidia*) bursting through the cortex (Fig. 31); and here, again, careful examination shows the darker smaller *Spermogonia* in patches between the *Æcidia*. These also arise from a fungus-mycelium in the tissues of the cortex, whence the fungus was named *Peridermium Pini* (var. *corticola*). It is thus seen that the fungus *Peridermium Pini* was regarded as a parasite of pines, and that it possessed two varieties, one inhabiting the leaves and the other the cortex: the "varieties" were so considered, because certain trivial differences were found in the minute structure of the *Æcidia* and *Spermogonia*.

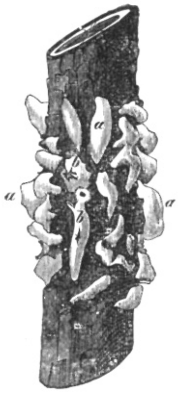


FIG. 32.—Blisters (*Æcidia*) of *Peridermium Pini* (var. *corticola*) on a branch of the Scotch pine: some of the *Æcidia* have already burst at the apex and scattered their spores, *b*, *b*; the others are still intact. (Natural size, after Hess.)

If we cut thin vertical sections through a leaf and one of the smallest *Æcidia*, and examine the latter with the microscope, it will be found to consist of a mass of spores arranged in vertical rows, each row springing from a branch of the mycelium: the outermost of these spores—*i.e.* those which form a compact layer close beneath the epidermis—remain barren, and serve as a kind of membrane covering the rest (Fig. 33, *p*). It is this membrane which protrudes like a blister from the tissues. The hyphæ of the fungus are seen running in all directions between the cells of the leaf-tissue, and as they rise up and form the vertical chains of spores, the pressure gradually forces up the epidermis of the leaf, bursts it, and the mass of orange-yellow powdery spores protrude to the exterior enveloped

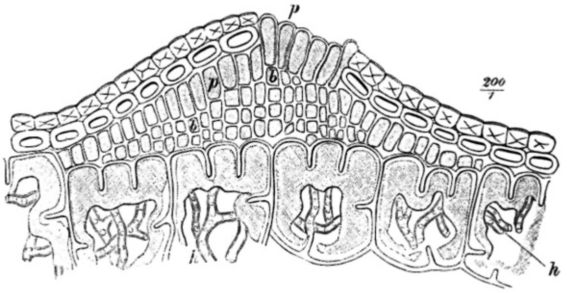


FIG. 33.—Vertical section through a very young *Æcidium* of *Peridermium Pini* (var. *acicola*), with part of the subjacent tissue of the leaf. *h*, the mycelium of the parasitic fungus running between the cells of the leaf: immediately beneath the epidermis of the leaf, the ends of the hyphæ give rise to the vertical rows of spores (*b*), the outermost of which (*p*) remain barren, and form the membrane of the blister-like body. The epidermis is already ruptured at *p* by the pressure of the young *Æcidium*. (After R. Hartig: highly magnified.)

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[1] Continued from p. 272.

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